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supervise the geotechnical investigation. In planning the investigation, the engineer or geologist must—

(A) Determine the number, location, and depth of borings and test pits using current prudent engineering practice for the size of the impoundment and the impounding structure, the quantity of material to be impounded, and subsurface conditions.

(B) Consider the character of the overburden and bedrock, the proposed abutment sites for the impounding structure, and any adverse geotechnical conditions that may affect the particular impoundment.

(C) Identify all springs, seepage, and groundwater flow observed or anticipated during wet periods in the area of the proposed impoundment.

(D) Consider the possibility of mudflows, rock-debris falls, or other landslides into the impoundment or impounded material.

[44 FR 15366, Mar. 13, 1979, as amended at 45 FR 51550, Aug. 4, 1980; 48 FR 44780, Sept. 30, 1983; 50 FR 16199, Apr. 24, 1985; 53 FR 43605, Oct. 27, 1988; 53 FR 48614, Dec. 1, 1988; 59 FR 52028, Oct. 20, 1994; 73 FR 75879, Dec. 12, 2008]

§ 784.17 Protection of publicly owned parks and historic places.

(a) For any publicly owned parks or any places listed on the National Register of Historic Places that may be adversely affected by the proposed operation, each plan shall describe the measures to be used.

(1) To prevent adverse impacts, or

(2) If a person has valid existing rights, as determined under § 761.16 of this chapter, or if joint agency approval is to be obtained under § 761.17(d) of this chapter, to minimize adverse impacts.

(b) The regulatory authority may require the applicant to protect historic and archeological properties listed on or eligible for listing on the National Register of Historic Places through appropriate mitigation and treatment measures. Appropriate mitigation and treatment measures may be required to be taken after permit issuance provided that the required measures are completed before the properties are affected by any mining operation.

[52 FR 4263, Feb. 10, 1987, as amended at 64 FR 70838, Dec. 17, 1999]

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§ 784.18 Relocation or use of public roads.

Each application shall describe, with appropriate maps and cross sections, the measures to be used to ensure that the interests of the public and landowners affected are protected if, under § 761.14 of this chapter, the applicant seeks to have the regulatory authority approve—

(a) Conducting the proposed surface coal mining operations within 100 feet of the right-of-way line of any public road, except where mine access or haul roads join that right-of-way; or

(b) Relocating a public road.

[44 FR 15366, Mar. 13, 1979, as amended at 64 FR 70838, Dec. 17, 1999]

§ 784.19 Disposal of excess spoil.

(a) If you, the permit applicant, propose to generate excess spoil as part of your operation, you must include the following items in your application—

(1) *Demonstration of minimization of excess spoil.* A demonstration, prepared to the satisfaction of the regulatory authority, that the operation has been designed to minimize, to the extent possible, the volume of excess spoil that the operation will generate, thus ensuring that spoil is returned to the mined-out area to the extent possible, taking into consideration applicable regulations concerning restoration of the approximate original contour, safety, stability, and environmental protection and the needs of the proposed postmining land use.

(2) *Capacity demonstration.* A demonstration, prepared to the satisfaction of the regulatory authority, that the designed maximum cumulative volume of all proposed excess spoil fills within the permit area is no larger than the capacity needed to accommodate the anticipated cumulative volume of excess spoil that the operation will generate, as approved by the regulatory authority under paragraph (a)(1) of this section.

(3) *Discussion of how you will address impacts to perennial and intermittent streams and related environmental values.* You must design the operation to avoid placement of excess spoil in or within 100 feet of a perennial or intermittent

stream to the extent possible. If avoidance is not possible, you must—

(i) Explain, to the satisfaction of the regulatory authority, why an alternative that does not involve placement of excess spoil in or within 100 feet of a perennial or intermittent stream is not reasonably possible.

(ii) Identify a reasonable range of alternatives that vary with respect to the number, size, location, and configuration of proposed fills. This provision does not require identification of all potential alternatives. You need identify only those reasonably possible alternatives that are likely to differ significantly in terms of impacts on fish, wildlife, and related environmental values. An alternative is reasonably possible if it meets all the following criteria:

(A) The alternative conforms to the safety, engineering, design, and construction requirements of the regulatory program;

(B) The alternative is capable of being done after consideration of cost, logistics, and available technology. The fact that one alternative may cost somewhat more than a different alternative does not necessarily warrant exclusion of the more costly alternative from consideration. However, an alternative generally may be considered unreasonable if its cost is substantially greater than the costs normally associated with this type of project.

(C) The alternative is consistent with the coal recovery provisions of § 817.59 of this chapter.

(iii) Analyze the impacts of the alternatives identified in paragraph (a)(3)(ii) of this section on fish, wildlife, and related environmental values. The analysis must consider impacts on both terrestrial and aquatic ecosystems.

(A) For every alternative that proposes placement of excess spoil in a perennial or intermittent stream, the analysis must include an evaluation of impacts on the physical, chemical, and biological characteristics of the stream downstream of the proposed fill, including seasonal variations in temperature and volume, changes in stream turbidity or sedimentation, the degree to which the excess spoil may introduce or increase contaminants, and the effects on aquatic organisms and the

wildlife that is dependent upon the stream.

(B) If you have prepared an analysis of alternatives for the proposed fill under 40 CFR 230.10 to meet Clean Water Act requirements, you may initially submit a copy of that analysis with your application in lieu of the analysis required by paragraph (a)(3)(iii)(A) of this section. The regulatory authority will determine the extent to which that analysis satisfies the analytical requirements of paragraph (a)(3)(iii)(A) of this section.

(iv) Select the alternative with the least overall adverse impact on fish, wildlife, and related environmental values, including adverse impacts on water quality and aquatic and terrestrial ecosystems.

(4) *Location.* Maps and cross-section drawings showing the location of all proposed disposal sites and structures. You must locate fills on the most moderately sloping and naturally stable areas available, unless the regulatory authority approves a different location based upon the alternatives analysis under paragraph (a)(3) of this section or on other requirements of the Act and this chapter. Whenever possible, you must place fills upon or above a natural terrace, bench, or berm if that location would provide additional stability and prevent mass movement.

(5) *Design plans.* Detailed design plans for each structure, prepared in accordance with the requirements of this section and §§ 817.71 through 817.74 of this chapter. You must design the fill and appurtenant structures using current prudent engineering practices and any additional design criteria established by the regulatory authority.

(6) *Geotechnical investigation.* The results of a geotechnical investigation of each proposed disposal site, with the exception of those sites at which spoil will be placed only on a pre-existing bench under § 817.74 of this chapter. You must conduct sufficient foundation investigations, as well as any necessary laboratory testing of foundation material, to determine the design requirements for foundation stability for each site. The analyses of foundation conditions must take into consideration the effect of underground mine workings, if any, upon the stability of

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the fill and appurtenant structures. The information submitted must include—

(i) The character of the bedrock and any adverse geologic conditions in the proposed disposal area.

(ii) A survey identifying all springs, seepage, and groundwater flow observed or anticipated during wet periods in the area of the proposed disposal site.

(iii) A survey of the potential effects of subsidence of subsurface strata as a result of past and future mining operations.

(iv) A technical description of the rock materials to be utilized in the construction of disposal structures containing rock chimney cores or underlain by a rock drainage blanket.

(v) A stability analysis including, but not limited to, strength parameters, pore pressures, and long-term seepage conditions. This analysis must be accompanied by a description of all engineering design assumptions and calculations and the alternatives considered in selecting the design specifications and methods.

(7) *Operation and reclamation plans.* Plans for the construction, operation, maintenance, and reclamation of all excess spoil disposal structures in accordance with the requirements of §§ 817.71 through 817.74 of this chapter.

(8) *Additional requirements for keyway cuts or rock-toe buttresses.* If keyway cuts or rock-toe buttresses are required under § 817.71(d) of this chapter, the number, location, and depth of borings or test pits, which must be determined according to the size of the spoil disposal structure and subsurface conditions. You also must provide the engineering specifications used to design the keyway cuts or rock-toe buttresses. Those specifications must be based upon the stability analysis required under paragraph (a)(7)(v) of this section.

(b) *Design certification.* A qualified registered professional engineer experienced in the design of earth and rock fills must certify that the design of all fills and appurtenant structures meets the requirements of this section.

[73 FR 75880, Dec. 12, 2008]

§ 784.20 Subsidence control plan.

(a) *Pre-subsidence survey.* Each application must include:

(1) A map of the permit and adjacent areas at a scale of 1:12,000, or larger if determined necessary by the regulatory authority, showing the location and type of structures and renewable resource lands that subsidence may materially damage or for which the value or reasonably foreseeable use may be diminished by subsidence, and showing the location and type of drinking, domestic, and residential water supplies that could be contaminated, diminished, or interrupted by subsidence.

(2) A narrative indicating whether subsidence, if it occurred, could cause material damage to or diminish the value or reasonably foreseeable use of such structures or renewable resource lands or could contaminate, diminish, or interrupt drinking, domestic, or residential water supplies.

(3) A survey of the condition of all non-commercial buildings or occupied residential dwellings and structures related thereto, that may be materially damaged or for which the reasonably foreseeable use may be diminished by subsidence, within the area encompassed by the applicable angle of draw; as well as a survey of the quantity and quality of all drinking, domestic, and residential water supplies within the permit area and adjacent area that could be contaminated, diminished, or interrupted by subsidence. If the applicant cannot make this survey because the owner will not allow access to the site, the applicant will notify the owner, in writing, of the effect that denial of access will have as described in § 817.121(c)(4) of this chapter. The applicant must pay for any technical assessment or engineering evaluation used to determine the pre-mining condition or value of such non-commercial buildings or occupied residential dwellings and structures related thereto and the quantity and quality of drinking, domestic, or residential water supplies. The applicant must provide copies of the survey and any technical assessment or engineering evaluation to the property owner and regulatory authority. However, the requirements to perform a survey of the condition of all